REMARKS

In the Office Action, the Examiner again rejected claims 5-8, 10 and 11 pursuant to 35 U.S.C. § 103(a) as being unpatentable over Smith et al. '095 (U.S. Patent No. 5,311,095) in view of Smith et al. '406 (U.S. Patent No. 4,366,406). Applicants respectfully request reconsideration of the rejections of claims 5-8 and 10-11, including independent claim 5.

Independent claim 5 recites transducer material arranged as an array of elements, where the array is a multidimensional array of M x N elements with both M and N greater than 1, and at least two electrically conductive matching layers on the transducer material on each one of the elements.

The Examiner notes, "since Smith (095) specifically desires the impedance matching layer #40 to be conductive to allow for the outside piezoelectric electrode to be electrically connected to ground, any subdivision of layer #40 (or provision of multiple layers for the acoustic impedance matching layer) would of necessity be electrically conductive for it to provide an operable device." However, both Smith '095 and Smith '406 disclose the conductive foil immediately adjacent the PZT (Smith '095 Col. 5, lines 37-42; and Smith '406 Col. 2, lines 41-50 and Figure 1). When adding a second matching layer taught by Smith '406, the conductive foil would be positioned somewhere. Since two layers are being used, the two-layer teaching would indicate placement of the foil. Smith '406 teaches the two layers, and position the foil immediately against the PZT (col. 2, lines 41-50 and Fig. 1). To position the foil when two layers are used, a person of ordinary skill in the art would have looked to the position taught by the two-layer teaching of Smith '406. Smith '095 at least notes that the foil may be on the PZT (col. 5, lines 38-42). A person of ordinary skill would have used the foil by the PZT given the teachings of Smith '406 for two layers and the same location possibility teaching of Smith '095. The matching layers would not have needed to be conductive.

The foil by the PZT for two layers would have been used for another reason - the material limitations noted by Smith '406. Smith '406 showing multiple matching layers teaches very specific non-conductive materials (plastic and glass) to achieve the desired two

layer acoustic match (Col. 2, lines 50-54 and 59-64; and Col. 3, lines 45-50). A materials problem results since other materials may not be found for the desired graduation of matching in the multiple layers (Col. 3, lines 47-50 and 54-60). For two or more matching layers, the goal is to provide graduation of acoustic impedance between the impedance of PZT and that of tissue. Different filler materials provide different impedance. There is no teaching that conductive filler or matching layer materials would provide the required graduation. Instead, Smith '406 clearly indicates use of plastic and glass for the two layers. Given this teaching of specific materials of Smith '406, the alternative of the foil next to the PZT with the specific non-conducting matching-layer materials would have been used. As indicated by Smith '406, a materials problem results for multi-matching layers, so specific non-conductive materials are used for multi-layer matching. Two or more conductive matching layers would not have been obvious, instead a person of ordinary skill in the art would have used the two non-conductive layers of Smith '406 with foil by the PZT.

The Examiner wrote, "it is not seen how the final design thickness of the matching layer is relevant to the obviousness of providing multiple impedance matching layers in place at a single layer." Smith '095 prefers a ¼ wavelength matching layer (Col. 5, lines 1-5). However, Smith '406 teaches ¼ wavelength matching as being undesired (Col. 1, lines 13-15 and 50-54). The thickness may result in different materials for the desired acoustic impedance. To use the conductive material of Smith '095, a ¼ wavelength-matching layer is desired. Smith '406 uses other thicknesses, so multiple layers would not have used the conductive layer of Smith '095. Smith '406 teaches away from the conductive ¼ matching of Smith '095. So a person of ordinary sill in the art would not have considered to materials of Smith '095.

Dependent claims 6-8 and 10-11 are allowable for the same reasons as base claim 5. Further limitations patentably distinguish from Smith '095 and Smith '406. Claim 11 recites signal traces connected with one of the electrically conductive matching layers. The prior art provides for a ground foil (Smith '095) or no mention of ground vs. signal (Smith '046). The Examiner notes signal traces as well known. However, it is well known to position signal traces on the backing side and a ground plane or foil on the matching layer side of the PZT.

The ground on the matching layer side avoids high voltage transmit waveforms adjacent the patient. A person of ordinary skill in the art would have used a ground plane, not signal traces, connected with the matching layers.

CONCLUSION:

Applicants respectfully submit that all of the pending claims are in condition for allowance and seeks early allowance thereof. If for any reason, the Examiner is unable to allow the application but believes that an interview would be helpful to resolve any issues, he is respectfully requested to call the undersigned at (650) 694-5810 or Craig Summerfield at (312) 321-4726.

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